Italian Botanist 17: 23–41 (2024)
doi: 10.3897/italianbotanist.17.123283
https://italianbotanist.pensoft.net

RESEARCH ARTICLE

Italian Botanist
Published by Società Botanica Italiana

Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 17

Sonia Ravera[1,2], Alfredo Vizzini[3], Marta Puglisi[4], Cecilia Totti[5], Claudia Angiolini[2,6], Mattia Martin Azzella[7], Giulia Bacilliere[4], Fabrizio Boccardo[8], Ilaria Bonini[6], Wolfgang von Brackel[9], Guido Brusa[10], Viviana Cavallaro[11], Laura Cancellieri[12], Silvia Cannucci[2,6], Marco Cantonati[13], Antonio B. De Giuseppe[13], Luca Di Nuzzo[14], Francesco Dovana[11], Emanuele Fanfarillo[6], Tiberio Fiaschi[6], Goffredo Filibeck[12], Luana Francesconi[14], Gabriele Gheza[14], Paolo Giordani[15], Anna Guttová[16], Josef Hafellner[17], Deborah Isocrono[18], Jiří Malíček[19], Helmut Mayrhofer[20], Giulia Miraglia[4], Juri Nascimbene[14], Pier Luigi Nimis[21], Silvia Ongaro[18], Giulio Pandeli[6], Luca Paoli[22], Nicodemo G. Passalacqua[13,23], Patrick Pinault[24], Chiara Pistocchi[14], Giovanna Potenza[25], Filippo Prosser[26], Domenico Puntillo[13], Michele Puntillo[13], Leonardo Rosati[25], Giovanni Sicoli[23], Manuel Tiburtini[27], Mauro Tretiach[21], Luciana Zedda[28]

1 *Dipartimento di Scienze e Tecnologie Biologiche Chimiche e Farmaceutiche (STEBICEF), Università di Palermo, Via Archirafi 38, 90123 Palermo, Italy* **2** *NBFC, National Biodiversity Future Center, Palermo 90133, Italy* **3** *Institute for Sustainable Plant Protection (IPSP) – CNR, Viale P.A. Mattioli 25, 10125 Torino, Italy* **4** *Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Sezione di Biologia vegetale, Università di Catania, Via A. Longo 19, 95125 Catania, Italy* **5** *Dipartimento di Scienze della Vita e dell'Ambiente, Università Politecnica delle Marche, via Brecce Bianche, 60131 Ancona, Italy* **6** *Dipartimento di Scienze della Vita, Università di Siena, Via P. A. Mattioli 4, 53100 Siena, Italy* **7** *Dipartimento di Pianificazione, design, tecnologia dell'architettura, Sapienza Università di Roma, Via Flaminia 72, 00196 Roma, Italy* **8** *Via Filippo Bettini 14/11, 16162 Genova, Italy* **9** *Büro für vegetationskundlich-ökologische Gutachten und Lichenologie, Kirchenweg 2, D-91341 Röttenbach, Germany* **10** *Via Corridoni 97, 21100 Varese, Italy* **11** *Dipartimento di Bioscienze, Biotecnologie e Ambiente (DBBA), Campus Universitario "Ernesto Quagliariello", Università degli Studi di Bari "Aldo Moro", Via Orabona 4, 70125 Bari, Italy* **12** *Dipartimento di Scienze Agrarie e Forestali, Università della Tuscia, Via S. C. de' Lellis snc, 01100 Viterbo, Italy* **13** *Museo di Storia Naturale della Calabria ed Orto Botanico, Università della Calabria, 87036 Arcavacata di Rende (Cosenza), Italy* **14** *BIOME Lab, Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Alma Mater Studiorum, Università di Bologna, Via Irnerio 42, 40126 Bologna, Italy* **15** *Dipartimento di Farmacia (DIFAR), Università di Genova, viale Cembrano 4, 16148 Genova, Italy* **16** *Plant Science and Biodiversity Centre, Slovak Academy*

Copyright *Sonia Ravera et al.* This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

of Sciences, Dúbravská cesta 9, SK-84523 Bratislava, Slovakia **17** *Institute of Biology, Division of Plant Sciences, University of Graz, NAWI Graz, Holteigasse 6, 8010 Graz, Austria* **18** *Dipartimento di Scienze Agrarie, Forestali e Alimentari, Università di Torino, Largo Paolo Braccini 2, 10095 Grugliasco, Torino, Italy* **19** *Institute of Botany, The Czech Academy of Sciences, Zámek 1, CZ-252 43 Průhonice, Czech Republic* **20** *Institute of Biology, Division of Plant Sciences, University of Graz, NAWI Graz, Holteigasse 6, 8010 Graz, Austria* **21** *Dipartimento di Scienze della Vita, Università di Trieste, Via L. Giorgieri 10, 34127 Trieste, Italy* **22** *Dipartimento di Biologia, Università di Pisa, Via Luca Ghini 13, 56126 Pisa, Italy* **23** *Dipartimento di Biologia, Ecologia e Scienze della Terra, Università della Calabria, 87036, Arcavacata di Rende (Cosenza), Italy* **24** *Impasse des Basses 8, Cours, FR-63119 Châteaugay, France* **25** *Scuola di Scienze Agrarie, Forestali, Alimentari e Ambientali, Università della Basilicata, Via dell'Ateneo Lucano 10, 85100 Potenza, Italy* **26** *Fondazione Museo Civico di Rovereto, Largo S. Caterina 41, 38068 Rovereto (Trento), Italy* **27** *PLANTSEED lab, Department of Biology, University of Pisa, Via Derna 1, 56126, Pisa (PI), Italy* **28** *BiodiversityProjects, Ließemer Str. 32 A, 53179 Bonn, Germany*

Corresponding author: Sonia Ravera (sonia.ravera@unipa.it)

Academic editor: Lorenzo Peruzzi | Received 19 March 2024 | Accepted 27 April 2024 | Published 3 June 2024

Citation: Ravera S, Vizzini A, Puglisi M, Totti C, Angiolini C, Azzella MM, Bacilliere G, Boccardo F, Bonini I, von Brackel W, Brusa G, Cavallaro V, Cancellieri L, Cannucci S, Cantonati M, De Giuseppe AB, Di Nuzzo L, Dovana F, Fanfarillo E, Fiaschi T, Filibeck G, Francesconi L, Gheza G, Giordani P, Guttová A, Hafellner J, Isocrono D, Malíček J, Mayrhofer H, Miraglia G, Nascimbene J, Nimis PL, Ongaro S, Pandeli G, Paoli L, Passalacqua NG, Pinault P, Pistocchi C, Potenza G, Prosser F, Puntillo D, Puntillo M, Rosati L, Sicoli G, Tiburtini M, Tretiach M, Zedda L (2024) Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 17. Italian Botanist 17: 23–41. https://doi.org/10.3897/italianbotanist.17.123283

Abstract

In this contribution, new data concerning algae, bryophytes, fungi and lichens of the Italian flora are presented. It includes new records and confirmations for the algal genera *Chara* and *Nitella*, the bryophyte genera *Brachythecium*, *Didymodon*, *Fissidens*, *Physcomitrium*, and *Riccia*, the fungal genera *Biatoropsis*, *Cantharellus*, *Coprinellus*, *Dacrymyces*, *Inosperma*, *Nigropuncta*, *Urocystis*, and *Xanthoriicola*, and the lichen genera *Arthonia*, *Bellemerea*, *Circinaria*, *Lecania*, *Lecanora*, *Lecidella*, *Mycobilimbia*, *Naetrocymbe*, *Parmelia*, *Peltigera*, *Porpidia*, *Scytinium*, and *Usnea*.

Keywords

Ascomycota, Basidiomycota, Bryidae, Charophyceae, Ricciaceae

How to contribute

The text of the records should be submitted electronically to: Cecilia Totti (c.totti@univpm.it) for algae, Marta Puglisi (mpuglisi@unict.it) for bryophytes, Alfredo Vizzini (alfredo.vizzini@unito.it) for fungi, Sonia Ravera (sonia.ravera@unipa.it) for lichens. Each text should be within 1,000 characters (spaces included).

Floristic records

Algae

***Chara contraria* Kütz (Characeae)**

+ **ABR**: Lago di Campotosto, Parco Nazionale del Gran Sasso e Monti della Laga, Campotosto (L'Aquila) (UTM WGS 84: 33T 364900.4709623), lake bottom between 0.5 and 8 m depth, 1300 m, 19 September 2023, *L. Rosati*, *L. Cancellieri*, *M.M. Azzella* (HLUC); Lago di Scanno, Scanno (L'Aquila) (UTM WGS 84: 33T 405320.4642277), lake bottom between 0.5 and 2 m depth, 922 m, 9 September 2023, leg. *L. Rosati*, *G. Filibeck*, det. *L. Rosati*, *M.M. Azzella* (HLUC). – Species new for the flora of Abruzzo.

This species has been reported only for a few Italian administrative regions, probably due to the difficulties in distinguishing it from *C. vulgaris* L. (Bazzichelli and Abdelahad 2009; Ravera et al. 2019). Nevertheless, genetic analyses performed by Schneider et al. (2016) showed that *C. contraria* belongs to a distinct lineage characterized by having a diplostichous and tylacanthous cortex (but spines varying in length), more related to *C. hispida* group rather than to *C. vulgaris* group. *Chara contraria* is quite common in the reservoir of Campotosto within *Chara globularis* Thuill. and/or *C. vulgaris* vegetation. We occasionally recorded it as the dominant species. On the contrary, in the natural lake of Scanno it is very rare and only associated to the vegetation dominated by *C. vulgaris* (Filibeck et al. 2023).

L. Rosati, M.M. Azella, G. Filibeck

***Chara globularis* Thuill. (Characeae)**

+ **ABR**: Lago di Campotosto, Parco Nazionale del Gran Sasso e Monti della Laga, Campotosto (L'Aquila) (UTM WGS 84: 33T 364900.4709623), lake bottom between 1 and 8 m depth, 1300 m, 19 September 2023, *L. Rosati*, *L. Cancellieri*, *M.M. Azzella* (UTV, HLUC); Lago di Scanno, Scanno (L'Aquila) (UTM WGS 84: 33T 405918.4641894), lake bottom between 3 and 7 m depth, 922 m, 9 September 2023, leg. *L. Rosati*, *G. Filibeck*, det. *L. Rosati*, *M.M. Azzella* (UTV, HLUC); Lago di Barrea, Parco Nazionale d'Abruzzo Lazio e Molise, Barrea (L'Aquila) (UTM WGS 84: 33T 414901.4623485), lake bottom between 0.5 and 5 m depth, 975 m, 20 July 2023, leg. *L. Rosati*, *G. Filibeck*, det. *L. Rosati*, *M.M. Azzella* (UTV, HLUC); Lago della Montagna Spaccata, Alfedena (L'Aquila) (UTM WGS 84: 33T 417315.4619457), lake bottom between 0.5 and 8 m depth, 1060 m, 22 August 2023, leg. *L. Rosati*, *G. Filibeck*, det. *L. Rosati*, *M.M. Azzella* (UTV, HLUC). – Species new for the flora of Abruzzo.

This species has been reported for most Italian administrative regions (Bazzichelli and Abdelahad 2009) and recently also for Liguria (Ravera et al. 2019). It is a species common in Italy and the most frequently reported of the genus after *C. vulgaris* L.

Probably, the lack of records from some regions is mainly due to a scarcity of specific studies. We have frequently observed it as the dominant species of the submerged vegetation in the Campotosto reservoir and in the natural lake of Scanno, mainly at 3–6 m depth. It is less common in the artificial basins of Barrea and Montagna Spaccata (see Filibeck et al. 2023 and Ravera et al. 2023 for ecological and floristic information on the submerged communities in these lakes).

L. Rosati, L. Cancellieri, G. Filibeck

Chara globularis Thuill. (Characeae)

+ **BAS**: Lago Pantano, Pignola (Potenza), lake bottom at 0.7 m depth (UTM WGS 84: 33T 562897.4493268), 764 m, 8 August 2015, leg. *L. Rosati*, *G. Potenza*, det. *L. Rosati* (HLUC). – Species new for the flora of Basilicata.

In the collection site, Characeae are very rare and occur as small patches, interspersed within a *Ceratophyllum demersum* L. dominated vegetation.

L. Rosati, G. Potenza

Chara gymnophylla A.Braun (Characeae)

+ **ABR**: Lago di Campotosto, Parco Nazionale del Gran Sasso e Monti della Laga, Campotosto (L'Aquila) (UTM WGS 84: 33T 365613 4709500), lake bottom between 1 and 6 m depth, 1300 m, 19 September 2023, *L. Rosati*, *L. Cancellieri*, *M.M. Azzella* (HLUC); Lago di Barrea, Parco Nazionale d'Abruzzo Lazio e Molise, Barrea (L'Aquila) (UTM WGS 84: 33T 414867.4623504), lake bottom between 1 and 5 m depth, 975 m, 20 July 2023, leg. *L. Rosati*, *G. Filibeck*, det. *L. Rosati*, *M.M. Azzella* (HLUC). – Species confirmed for the flora of Abruzzo.

Chara gymnophylla is a controversial taxon, considered by some authors only as a variety of *C. vulgaris* L. (Bazzichelli and Abdelahad 2009; Schneider et al. 2016) and by others as a good species (e.g., Caisová and Gąbka 2009; Guiry and Guiry 2024). Probably for this reason, in Italy it has been recorded only for some administrative regions (Bazzichelli and Abdelahad 2009) and was not previously listed for Abruzzo, even if the sample illustrating this taxon in Bazzichelli and Abdelahad (2009) was collected in August 2008 from Lecce nei Marsi (L'Aquila, Abruzzo). Thus, our records are a confirmation for the flora of Abruzzo. *Chara gymnophylla* can be distinguished from *C. vulgaris* s.str. because of its ecorticated branchlets (or with 1–2 corticated basal segments) plus completely ecorticate fertile segments (Bazzichelli and Abdelahad 2009; Caisová and Gąbka 2009).

L. Rosati, M.M. Azzella, L. Cancellieri

Nitella tenuissima (Desv.) Kutzing (Characeae)

+ **TOS**: pond in a coppice along the road SP 441, Chiusdino (Siena) (UTM WGS84: 32T 674115.4779143), 318 m, 27 April 2023, *T. Fiaschi*, *S. Cannucci*, *C. Angiolini* (SIENA). – Species new for the flora of Toscana.

Inside a shallow pond (about 850 m^2), in a *Quercus cerris* L. coppice, not far from the street, we found a consistent fertile population of *N. tenuissima* together with an even larger population of *Chara globularis* Thuill. These are two indicator species of the Habitat Directive "Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp." (code 3140; Biondi et al. 2009). The populations have been found near the pond bank. Indeed, species of small dimensions like *N. tenuissima*, occur in the shallow part of the wetlands, while larger species, such as *C. globularis*, in the deepest parts. In Italy, *Nitella tenuissima* has been recorded in Lombardia, Veneto, Lazio, and Sicilia (Bazzichelli and Abdelahad 2009).

T. Fiaschi, S. Cannucci, C. Angiolini

BRYOPHYTES

Brachythecium albicans (Hedw.) Schimp. (Brachytheciaceae)

+ **BAS**: Piano Iannace (Potenza) (UTM WGS84: 33S 602151.4421774), on open soil at the border of the beech wood, 1705 m, 6 July 2012, leg. *M. Puglisi*, det. *M. Puglisi*, *G. Bacilliere* (CAT). – Species confirmed for the flora of Basilicata.

Brachythecium albicans is a boreo-temperate species, frequently occurring on sandy or gravelly, unshaded and preferably acid soils in open habitats. This species is distinguished by its pale whitish-green or yellow-green, string-like shoots. Despite being quite common in Italy, for some southern regions (Campania, Calabria and Basilicata) there are exclusively old reports based on collections published before 1968 (Aleffi et al. 2020). This record is a confirmation of the species for the flora of Basilicata more than 80 years after the last reports (Zodda 1913; Giacomini 1938).

M. Puglisi, G. Bacilliere, G. Miraglia

Didymodon sinuosus (Mitt.) Delogne (Pottiaceae)

+ **TAA**: Villa Lagarina, Guerrieri-Gonzaga Park (Trento) (UTM WGS84: 32T 657387.5086611), along a 5 m long section of the limestone stone irrigation gully, 195 m, 7 February 2024, *F. Prosser* (ROV 07001); *ibidem* (UTM WGS84: 32T 657262.5086641), 205 m, *F. Prosser* (ROV 07002). – Species new for the flora of Trentino-Alto Adige.

Didymodon sinuosus was found in one of the best-preserved historical parks in Trentino, in two points of the gully that was built together with the garden about two centuries ago (Codroico 2004). This species usually grows on damp, calcareous rocks along watercourses, but also park-like areas (Meier and Roloff 2017). In Villa Lagarina, *D. sinuosus* is accompanied by *Amblystegium serpens* (Hedw.) Schimp., *Brachythecium rutabulum* (Hedw.) Schimp., *Plagiomnium cuspidatum* (Hedw.) T.J.Kop. This species is common in the central-southern part of Italy, while it is quite rare in the northern regions (Aleffi et al. 2020).

F. Prosser

***Fissidens osmundoides* Hedw. (Fissidentaceae)**

+ **TOS**: Chiusdino (Siena) (UTM WGS84: 32T 674113.4779118), in the rocky bed of a stream in a deciduous forest, near a pond, 324 m, 15 October 2023, *T. Fiaschi*, *E. Fanfarillo*, *I. Bonini* (SIENA). – Species confirmed for the flora of Toscana.

Fissidens osmundoides is a circumpolar boreo-arctic montane species, that grows on wet rocks, in meadows, and along streams (Cortini Pedrotti 2001). According to Aleffi et al. (2020), this species occurs in all the administrative regions of northern Italy, in Umbria, Lazio, and Campania; its presence in Toscana was considered doubtful, based on a record published before 1968 (Pellegrini 1942).

T. Fiaschi, E. Fanfarillo, I. Bonini

***Physcomitrium patens* (Hedw.) Mitt. (Funariaceae)**

+ **TOS**: Chiusdino (Siena) (UTM WGS84: 32T 675041.4781574), in the muddy bed of a dried-up pond, 270 m, 15 October 2023, *T. Fiaschi*, *C. Angiolini*, *E. Fanfarillo*, *I. Bonini* (SIENA). – Species new for the flora of Toscana.

Physcomitrium patens is an Eurosiberian Temperate, short-lived pioneer species, that colonizes wet mud and sediment (Blockeel et al. 2014). In Italy, it has a fragmented distribution throughout the country. In the north, it is recorded for Lombardia, Trentino-Alto Adige, Veneto, and historically (before 1968) for Piemonte. Moreover, further south it occurs in Abruzzo, Calabria and Sicilia (Aleffi et al. 2020). In the new locality *Ph. patens* was found with abundant capsules.

T. Fiaschi, I. Bonini, C. Angiolini

***Riccia ciliifera* Link ex Lindenb. (Ricciaceae)**

+ **TOS**: Botanical Garden, Pisa (UTM WGS84: 32T 612513.4841820), on damp clay along the paths that separate the flowerbeds, 4 m, 18 Feb 2022, *M. Tiburtini* (PI061638). – Species confirmed for the flora of Toscana.

Riccia ciliifera is a liverwort species quite common in Italy, that was first recorded for Toscana in 1901 by Attilio Tassi, in the Botanical Garden of Siena (Aleffi et al. 2020). *Riccia ciliifera* can be distinguished from other members of *R.* subg. *Riccia* by wide thallus and violet-purple thalli margins. This species is closely related to *R. gougetiana* Durieu & Mont., from which it differs for the thallus colour and larger lobes, smaller cells of ventral scales, spore ornamentation pattern and size (larger in *R. gougetiana*).

M. Tiburtini, G. Pandeli, G. Brusa

FUNGI

***Biatoropsis hafellneri* Millanes, Diederich, M.Westb. & Wedin (Tremellaceae)**

+ **ITA** (**SAR**): Monte di Seneghe, loc. Cuguzzu, along the forest road to loc. Fontanas (Oristano) (UTM WGS84: 32T 4440628 462640), on thalli of *Usnea cornuta* Körb.,

711 m, 2 July 2023, leg. *P. Giordani*, det. *W. v. Brackel* (GE2868, hb Brackel 8997). – Species new to Italy (Sardegna).

This recently described lichenicolous fungus is confined to the thallus of *Usnea* Dill. ex Adans. species (*U. fragilescens* Hav. ex Lynge agg., especially *Usnea cornuta* Körb.), where it causes the formation of typical pale to medium orange galls, containing 1-septate basidia with laterally elongating cells. This species is known from several countries in Europe and Macaronesia (Millanes et al. 2016; Roux et al. 2020; Diederich et al. 2022). At the site it was found on epiphytic thalli of *U. cornuta* growing on branches and trunks of *Quercus ilex* L. in a dense mature forest. The species is new for the flora of the Mediterranean.

W. v. Brackel, P. Giordani

***Cantharellus pallens* Pilát (Hydnaceae)**

+ **CAL**: Botanical Garden, University of Calabria, Rende (Cosenza) (UTM WGS84: 33S 605968.4357304), on the ground in a hardwood coppice stand (*Quercus pubescens* Willd. as prevailing tree species), 18 October 2023, *N.G. Passalacqua*, *A.B. De Giuseppe*, *G. Sicoli* (CLU F331). – Species new to Calabria.

Sparse groups of gregarious basidiomata referable to the genus *Cantharellus* Adans. ex Fr. were detected on the ground in a coppice stand mainly composed of deciduous oak trees. *Cantharellus pallens* is very similar to the better known *C. cibarius* Fr., which produces smaller but more strongly and uniformly yellow-coloured pilei without pruina on the upper surface (Courtecuisse and Duhem 1995; Knudsen et al. 1997; Matteucci 2013). According to Onofri et al. (2013), this fungus had not been reported from Calabria. In a later report (Caroti et al. 2015), the illustration referred to this species for Calabria seems to fit better with another species, i.e. *Cantharellus alborufescens* (Malençon) Papetti & S. Alberti, so much so that no further occurrence of *C. pallens* was indicated in the more recent check list of the macromycetes of Calabria (Siniscalco et al. 2018a, b).

N.G. Passalacqua, A.B. De Giuseppe, G. Sicoli

***Coprinellus domesticus* (Bolton) Vilgalys, Hopple & Jacq. Johnson (Psathyrellaceae)**

+ **CAL**: Botanical Garden, University of Calabria, Rende (Cosenza) (UTM WGS84: 33S 605988.4357068), on the ground in the grass, close to the butt of a cut Italian poplar tree (*Populus nigra* L. subsp. *italica* Duroi), 220 m, 20 March 2023, *G. Sicoli*, *A.B. De Giuseppe*, *N.G. Passalacqua* (CLU F332). – Species new to Calabria.

A solitary coprinoid basidiome was observed on the ground among the grass in the proximity of the collar of a cut Italian poplar tree. In Italy, *C. domesticus* has been reported as widespread in many regions, but not in Calabria, so far (Onofri et al. 2013).

G. Sicoli, A.B. De Giuseppe, N.G. Passalacqua

Coprinellus silvaticus (Peck) Gminder (Psathyrellaceae)

+ **CAL**: Botanical Garden, University of Calabria, Rende (Cosenza) (UTM WGS84: 33S 605841.4357398), on the ground in the litter of a downy oak tree (*Quercus pubescens* Willd.) coppice stand, 210 m, 24 November 2021, *G. Sicoli, N.G. Passalacqua, A.B. De Giuseppe* (CLU F334). – Species new to Calabria.

A solitary and apparently fragile basidiome, 3 cm high, with a plicate and acutely campanulate pileus was observed on the ground, emerging from the litter close to the base of an old stump of a presumably downy oak tree in a mixed deciduous and broad-leaved tree coppice stand. This fungus has been reported in a few regions between central and northern Italy, but in southern Italy only in Sicilia, so far (Onofri et al. 2013).

G. Sicoli, N.G. Passalacqua, A.B. De Giuseppe

Dacrymyces capitatus Schwein. (Dacrymycetaceae)

+ **CAL**: Botanical Garden, University of Calabria, Rende (Cosenza) (UTM WGS84: 33S 605841.4357398), on the wood of a dead branch fallen on the ground from a downy oak tree (*Quercus pubescens* Willd.), 200 m, 27 September 2023, *G. Sicoli, N.G. Passalacqua, A.B. De Giuseppe* (CLU F333). – Species new to Calabria.

A group of gelatinous, pustulate, discoid and shortly stipitate fungal-like structures were observed on the dead wood of a branch laying on the ground at the base of a downy oak tree. They were also orange-coloured and densely appressed, each measuring 1–3 mm in diameter. Under the light microscope these structures revealed to consist of septate but clampless, thick-walled and rough hyphae, some of them apically bifurcate, each branch bearing a cylindrical to allantoid and 3–4-septate hyaline spore measuring 12–15 × 4–6 µm. The above characteristics led to identify this fungus as a basidiomycete belonging to *D. capitatus* (Jülich 1989; Torkelsen 1997), a rarely observed species in Italy, apparently not yet recorded in Calabria (Onofri et al. 2013).

G. Sicoli, N.G. Passalacqua, A.B. De Giuseppe

Inosperma quietiodor (Bon) Matheny & Esteve-Rav. (Inocybaceae)

+ **LIG**: Santuario Basilica nostra Signora di Montallegro, Rapallo (Genova), on the ground under the crown of holm oak (*Quercus ilex* L.) (UTM WGS84: 32T 520782.4912978), 600 m, 14 October 2020, *F. Boccardo* (GDOR 4978). – Species new to Liguria.

Inosperma quietiodor is an ectomycorrhizal fungus similar to *I. cookei* (Bres.) Matheny & Esteve-Rav., from which it can be mainly distinguished for the different smell. It is similar to that of *Lactarius quietus* (Fr.) Fr. in young specimens of *I. quietiodor*, and honey-like in *I. cookei*. The spore dimensions of the Ligurian collection (9.0–10.5 × 5.0–6.0 µm) fit well with those reported by Kuyper (1986) and Ferrari et al. (2014). This species is widespread in Europe but apparently rare (Kuyper 1986). It has been reported in Italy from Piemonte (Ferrari et al. 2014).

F. Dovana, F. Boccardo, V. Cavallaro

***Nigropuncta rugulosa* D.Hawksw. (Ascomycota)**

+ **LOM**: Southern Rhaetian Alps, Presanella-group, Passo del Tonale, S above the pass towards Passo del Paradiso (Brescia) (UTM WGS84: 32T 621719.5123345), gentle slope exposed to the N, granitic boulder field surrounded by krummholz of *Alnus alnobetula* (Ehrh.) K.Koch, in overhangs of big boulders, on thallus of *Bellemerea cinereorufescens* (Ach.) Clauzade & Cl.Roux, ca. 1950 m, 24 July 2006, *J. Hafellner*, *L. Muggia* (no. 85840 GZU). – Species new to Lombardia.
+ **VDA**: Alpi Pennine, Colle de Gran San Bernardo, just SW below the pass (Aosta) (UTM WGS84: 32T 357153.5081436), outcrops of siliceous rocks in alpine grassland on steep slope exposed to the S, on vertical rock faces, on thallus of *Bellemerea cinereorufescens* (Ach.) Clauzade & Cl.Roux, ca. 2500 m, 1 August 2001, *J. Hafellner*, *P.L. Nimis*, *M. Tretiach*) (no. 87142 GZU). – Species new to Val d'Aosta.
+ **PIE**: Alpi Cozie, mountains W of Pinerolo, northeastern slopes and ridges of the Punta Cialáncia S above the village Perrero (Torino) (UTM WGS84: 32T 351702.4971705), boulders and cliffs of siliceous rocks, on steep rock faces of cliffs exposed to the N, on thallus of *Bellemerea cinereorufescens* (Ach.) Clauzade & Cl.Roux, ca. 2350 m, 26 July 2001, *J. Hafellner* (with *P.L. Nimis* and *M. Tretiach*) (no. 69397 GZU); Alpi Marittime, Rocca dell'Abisso W of Colle di Tenda, E below summit, steep slopes towards uppermost Vallone dell'Abisso (Cuneo) (UTM WGS84: 32T 380673.4888905), cliffs, outcrops and dispersed boulders of gneiss exposed to the E, on steep rock faces, on thallus of *Bellemerea cinereorufescens* (Ach.) Clauzade & Cl.Roux, ca. 2630 m, 22 July 2000, *A. Hafellner*, *J. Hafellner* (with *M. Tretiach*) (no. 87392 GZU). – Species new to Piemonte.

Nigropuncta rugulosa is widely distributed and not rare in the Holarctic. In Italy, this species was so far only recorded by one of the author's early collections from the mountain "Äusserer Nockenkopf" in Trentino-Alto Adige (northwestern Südtirol) (Hawksworth and Poelt 1986; Brackel 2016; Nimis and Martellos 2024).

J. Hafellner

***Urocystis eranthidis* (Pass.) Ainsw. & Sampson (Urocystidaceae)**

+ **CAL**: Piano del Ratto, Civita (Cosenza), on petioles of living leaves of *Eranthis hyemalis* (L.) Salisb. (UTM WGS 84: 33S 609636.4414586), 1382 m, 5 May 2023, *D. Puntillo* (CLU F486). – Species new to Calabria.

This species may be confused with a smut fungus recently described on *Eranthis longistipitata* host as *Entyloma eranthidis* T.Denchev, Denchev, Kemler & Begerow, but it shows single spores or arranged in irregular groups while in *U. eranthidis* the spores are in balls with collapsed sterile cells around. *Urocystis eranthidis* has been included in the Berlin Red List as threatened with extinction due to the rarefaction of the host plant (Scholz and Scholz 2005). In Calabria the species is quite rare as it is extremely localized. In Italy is known from Piemonte, Emilia-Romagna, Umbria and Marche (Ciferri 1938).

D. Puntillo, M. Puntillo

***Xanthoriicola physciae* (Kalchbr.) D.Hawksw. (Ascomycota)**

+ **FVG**: Southern Alps, Carnic Alps, W of Ampezzo by the road to Passo del Pura, near Albergo e Ristorante Pura (Udine) (UTM WGS84: 33T 328363.5142458), solitary *Juglans regia* L. in a meadow, on branches in the lower canopy, on apothecia of *Xanthoria parietina* (L.) Th.Fr., 715 m, 17 August 1994, *J. Hafellner* (GZU - JH87839). – Species new to Friuli-Venezia Giulia.
+ **VEN**: southern Alps, Venetian Alps, Nevegal SE of Belluno, slopes exposed to NE, surroundings of the valley station of the chair-lift on Col Faverghera (Belluno) (UTM WGS84: 33T 289558.5107681), mixed coniferous forest, on bark of *Picea abies* (L.) H.Karst., on apothecia of *Xanthoria parietina* (L.) Th.Fr., 1030 m, 31 August 2002, *J. Hafellner* (GZU - JH61057). – Species new to Veneto.
+ **PIE**: Western Alps, Alpi Cozie, at the entrance into the Vallone dell'Arma, just W of the village Fèdio (Cuneo) (UTM WGS84: 32T 362234.4909422), scattered trees in a pasture, on bark of *Populus* spec. (hybrid), on apothecia of *Xanthoria parietina* (L.) Th.Fr., 980 m, 23 July 2000, *J. Hafellner*, *P. L. Nimis*, *M. Tretiach*) (GZU - JH87661). – Species new to Piemonte.

In Italy, most records of this otherwise common species are recent and originate from the central and southern parts of the country (Brackel 2016). In the north of Italy, this species has so far been reported only for Lombardia (Santesson 1994; Brackel 2013). Interestingly, there is no historical record of this conspicuous fungus.

J. Hafellner

LICHENS

***Arthonia phlyctiformis* Nyl. (Arthoniaceae)**

+ **ITA** (**PUG**): Giardini Pubblici G. Garibaldi (formerly Villa della Lupa) di Lecce (Lecce) (UTM WGS84: 34T 260071.4471008), on fallen branches, March 2023, leg. *P. Pinault*, conf. *C. Roux*, *M. Grube* (Herb. Pinault, TSB). – Species new to Italy (Puglia).

This epiphytic species is clearly lichenized with non-Trentepohlioid algae, and is seemingly apparently not rare along the eastern coast of the Iberian Peninsula, especially on acid-barked trees, and is also known from France (Languedoc-Roussillon and Pyrénées-Orientales, see Gerstmans and Ertz 2016).

P. Pinault, P.L. Nimis, J. Nascimbene

***Bellemerea alpina* (Sommerf.) Clauzade & Cl.Roux (Lecideales)**

+ **TOS**: Northern Apennines, surroundings of Abetone, Val di Luce, Alpe Tre Potenze, along lift route Sciovia "La Fariola" (Pistoia) (UTM WGS84: 32T 631036.4886844), on siliceous boulders on slope exposed to the N, c. 1730 m, 27 October 1978, *J. Hafellner* (no. 3859 GZU); *ibidem*, 27 October 1978, *J. Poelt* (GZU). – Species new to Toscana.

This species grows on siliceous boulders including metal-rich rock types, preferably on slightly to medium-inclined rock faces. It shows a bipolar distribution, since it is widely distributed in the Northern Hemisphere and common in the Alps from the treeline ecotone to the alpine belt (Nimis et al. 2018). In Italy, *B. alpina* has so far been reported mostly for the northern regions (Nimis and Martellos 2024). A historical record from Sicilia is regarded as doubtful (Nimis 1993), so that this record is the first outside the Alps in Italy.

J. Hafellner

***Bellemerea cinereorufescens* (Ach.) Clauzade & Cl.Roux (Lecideales)**

+ **VDA**: Alpi Pennine, Colle del Gran San Bernardo, just SW below the pass, (Aosta) (UTM WGS84: 32T 357153.5081436), outcrops of siliceous rocks in alpine grassland on steep slope exposed to the S, on vertical rock faces, c. 2500 m, 1 August 2001, *J. Hafellner, P.L. Nimis, M. Tretiach*) (no. 87126 GZU). – Species confirmed for Val d'Aosta. + **TOS**: Northern Apennines, surroundings of Abetone, Val di Luce, Alpe Tre Potenze, along lift route Sciovia "La Fariola" (Pistoia) (UTM WGS84: 32T 631036.4886844), on siliceous boulders on slope exposed to the N, 1500–1820 m, 27 October 1978, *J. Poelt* (GZU) Label text in German language. – Species new to Toscana.

Bellemerea cinereorufescens shows a bipolar distribution, since it is widely distributed in the Northern Hemisphere and common in the Alps concentrated in the alpine belt (Nimis et al. 2018). This species is recorded for the Alps in Italy (Nimis and Martellos 2024), but many of the records are historical (Nimis 1993) as is the one for Valle d'Aosta (Cengia Sambo 1932). Outside the Alps it has been reported from a few localities in the Emilia-Romagna (Fariselli et al. 2020) but these records need confirmation. Historical records for Sardegna and Sicilia have been regarded as doubtful (Nimis and Martellos 2024). For some further records from localities in northern regions see in the Fungi section under *Nigropuncta rugulosa*.

J. Hafellner

***Circinaria nimisii* Sohrabi, H.Mayrhofer, Obermayer & S.D.Leav. (Megasporaceae)**

+ **ITA** (**ABR**): Gran Sasso Massif, below Corno Piccolo (L'Aquila) (UTM WGS84: 380609.4703809 33T), on vertical faces of calcareous rocks, 2350 m, 9 August 1996, *P.L. Nimis, M. Tretiach* (TSB 13559). – Species new to Italy (Abruzzo).

This species was recently described from Mt. Olympus (Greece) as a vagrant lichen in steppe-like vegetation over calcareous substrata. Specimens collected on rock in the Gran Sasso Massif (central Apennines) were provisionally identified by Nimis and Tretiach (1999) as *Aspicilia desertorum* auct. p.p. non (Kremp.) Mereschk. and then assigned to the *Circinaria elmorei*-group by Nimis (2016). However, these specimens correspond perfectly with the description of *C. nimisii* (Sohrabi et al. 2023), with the only difference that the thalli are in this case very easily detachable, but not truly vagrant.

P.L. Nimis, J. Nascimbene

***Lecania cyrtellina* (Nyl.) Sandst. (Ramalinaceae)**

+ **TOS**: Botanical Garden of the University of Pisa (Pisa) (UTM WGS84: 32T 612451.4841719), on the bark of *Jubaea chilensis* (Molina) Baill., 4 m, 3 April 2023, leg. *A. Guttová*, *L. Paoli*, det. *L. Paoli*, *Z. Fačkovcová*, *A. Guttová*, (SAV0017676). – Species new to Toscana.

Lecania cyrtellina is a crustose lichen with sessile lecanorine apothecia (at least when young), often clustered, growing mainly on base-rich barks of deciduous trees. This species is very similar to *L. cyrtella* (Ach.) Th.Fr. from which can be distinguished by smaller apothecia (0.1–0.3 mm vs. 0.2–0.7 mm) and smaller ascospores (mostly 1-septate vs. unicellular) (Nimis and Martellos 2024).

L. Paoli, A. Guttová

***Lecanora horiza* (Ach.) Linds. (Lecanoraceae)**

+ **PIE**: Grugliasco (Torino), garden of the University campus (UTM WGS84: 32T 389099.4991344), on bark of *Acer* sp., 300 m, 10 January 2024, *S. Ongaro*, *D. Isocrono* (ORO292). – Species new to Piemonte.

Lecanora horiza is a mainly Mediterranean member of the *L. subfusca* group, much rarer in the northern than in the Mediterranean parts (Nimis 2024). Lichens of the *L. subfusca* group shows large morphological variability, especially in the size and shape of apothecia (Malíček 2014): epihymenium without crystals, medulla with small irregular crystals not dissolving in K, fine granules soluble in K in the thalline exciple with an adjacent crystal-free zone are the diagnostic features. This species is similar to *L. allophana* (Ach.) Nyl. that differs in having an indistinct cortex and larger ascospores.

D. Isocrono, S. Ongaro

***Lecidella flavosorediata* (Vězda) Hertel & Leuckert (Lecanoraceae)**

+ **EMR**: Between Ponte Scodellino and Case Prasottano, Borgo Val di Taro (Parma), on trunks of *Quercus cerris* L. in a broadleaved woodland (UTM WGS84: 32T 559710.4924880), 499 m, 14 November 2023, leg. *L. Francesconi*, *G. Gheza*, det. *L. Francesconi*, *G. Gheza*, *H. Mayrhofer* (GZU). – Species new to Emilia-Romagna.

Lecidella flavosorediata is an epiphytic species with conspicuous yellowish soredia (Tønsberg 1992), most frequent on deciduous trees and conifers in southern Italy (Ravera et al. 2022). This species is distinguished from other mainly sterile crustose sorediate lichens by its chemistry (arthothelin and granulosin; Tønsberg 1992). It was scatteredly reported from several administrative regions throughout Italy (Nimis and Martellos 2024).

L. Francesconi, G. Gheza, H. Mayrhofer

***Mycobilimbia sphaeroides* (Dicks.) S.Ekman & Printzen (Ramalinaceae)**

+ **CAM**: Parco Nazionale del Cilento, Vallo di Diano e Alburni, loc. Vesalo, Laurino (Salerno) (UTM WGS84 33T 531031.4459202), on trunks of *Alnus cordata* (Loisel.) Duby along the river Calore, 980 m, 5 February 2024, *S. Ravera* (PAL). – Species new to Campania.

Mycobilimbia sphaeroides is a crustose species which grows on sheltered, mature deciduous tree trunks often around their bases, in old woodlands. In the collecting site, this species colonizes large portions of alder bark with fertile thalli of *Lobaria pulmonaria* (L.) Hoffm. and the Lobarion species *Fuscopannaria ignobilis* (Anzi) P.M.Jørg. *Lobarina scrobiculata* (Scop.) Cromb., *Pectenia plumbea* (Lightf.) P.M.Jørg., L.Lindblom, Wedin & S.Ekman, *Ricasolia amplissima* (Scop.) De Not., and *Vahliella saubinetii* (Mont.) P.M.Jørg.

S. Ravera

***Naetrocymbe rhododendri* (Arnold) Hafellner & Türk (Naetrocymbaceae)**

+ **LOM**: trail between Rifugio Albani and Passo dello Scagnello, Colere (Bergamo), on dead stems of dwarf shrubs in a high-altitude open habitat on limestone (UTM WGS84: 32T 581589.5090883), 1980 m, 26 August 2023, *G. Gheza, L. Di Nuzzo* (BOLO). – Species new to Lombardia.

Naetrocymbe rhododendri typically occurs on the bark of dwarf shrubs in subalpine and alpine heaths. It was reported scatteredly from the Italian Alps, where it is likely more widespread (Nimis and Martellos 2024). It can be identified by its typical spores, which are club-shaped, bicellular, with one cell larger than the other, often both guttulate.

G. Gheza, C. Pistocchi, L. Di Nuzzo

***Parmelia discordans* Nyl. (Parmeliaceae)**

+ **ITA** (**SAR**): Fonni (Nuoro) (UTM WGS84 32T 524915.4436399), on granite boulders on pastures 5 km SE of village, 1300 m, 1 May 2012, *J. Malíček* (PRA). – Species new to Italy (Sardegna).

Parmelia discordans is a foliose species which grows on siliceous rocks and screes, closely related to *P. omphalodes* (L.) Ach., from which it differs mainly in the content of protocetraric acid. So far, it is known only in Europe (GBIF.org 2024) where it is mainly coastal in Scandinavia, and usually restricted to upland areas in central and southern Europe (Nimis and Martellos 2024).

J. Malíček, S. Ravera

***Peltigera lepidophora* (Vain.) Bitter (Peltigeraceae)**

+ **LIG**: Alpi Liguri, mountain ridge S above the village Monesi, on the ridge W above the Colle del Garezzo (Imperia) (UTM WGS84: 32T 401686 4877849), small outcrops of

calcareous schist in subalpine pasture, in fissures filled with soil, 1850 m, 21 July 2000, *J. Hafellner, P. L. Nimis, M. Tretiach*) (GZU - JH87261). – Species new to Liguria.

Diagnostic for *P. lepidophora* are the peltate isidia and the slightly tomentose upper surface (Vitikainen 1994). The species is easily overlooked because of its small size or in the dry stage mistaken for juvenile *P. leucophlebia* (Nyl.) Gyeln. This species shows a circumpolar distribution in the Holarctic. It is also reported from the Andes in South America, the Himalayas in Asia, New Zealand and Hawaii (Poelt 1990; Vitikainen 1994). Apart from some other mountains systems, this species is known in Europe throughout the Alps (Nimis et al. 2018). In Italy, this species has been reported from almost all Alpine regions, from the high mountain areas of the Apennines, and from Sicilia (Nimis 1993, 2016; Nimis and Martellos 2024).

J. Hafellner, P. L. Nimis, M. Tretiach

***Porpidia tuberculosa* (Sm.) Hertel & Knoph (Lecideaceae)**

+ **LOM**: Central Alps, Southern Rhaetian Alps, Presanella-group, Passo del Tonale, S above the pass towards Passo del Paradiso, gentle slope exposed to the N (Brescia) (UTM WGS84: 32T 621719.5123345), boulder field surrounded by krummholz, on inclined rock faces of big siliceous boulders, 1950 m, 24 July 2006, leg. *J. Hafellner, L. Muggia*, det. *J. Hafellner* (GZU - JH87838). – Species confirmed for Lombardia.
+ **CAL**: Serre di Catanzaro, Monte Corvo (Catanzaro), (UTM WGS84: 33S 620896.4360354), outcrops of siliceous rocks, 1020 m, 14 July 1988, *J. Poelt* (GZU). – Species new to Calabria.
+ **SIC**: Le Madonie, by the road from Piano Battaglia to Petralia Sottana, Bosco Pomieri (Palermo) (UTM WGS84: 33S 417772.4190200), in a small shady ravine, on boulders of siliceous sandstone along the creek, 1300 m, 31 May 1988, *J. Hafellner* (GZU - JH12363); *ibidem*, 31 May 1988, *J. Poelt* (GZU). – Species new to Sicilia.

Porpidia tuberculosa usually grows at sites with high humidity on persistently moist siliceous rocks near the ground. This species is widely distributed in Italy (Nimis and Martellos 2024). However, as it is found mostly as a sterile saxicolous crust, it is often overlooked or ignored. Only a historical record by S. Garovaglio (Nimis 1993) is available for Lombardia. In Sicilia the species has so far been recorded from offshore islands, namely by Jatta (1886, under the name *Lecidea sorediza* Nyl.) from one of the Pelagie Islands and by Klement (1969, under the name *Lecidea sorediza* Nyl.) from the Aeolian Islands. However, these latter records need confirmation (Nimis 1993, 2016).

J. Hafellner

***Scytinium plicatile* (Ach.) Otálora, P.M.Jørg. & Wedin (Collemataceae)**

+ **TOS**: Natural Reserve Monte Penna, Castell'Azzara (Grosseto) (UTM WGS84: 32T 718245.4739165), on partially shaded calcareous outcrops, in a mixed *Acer* sp. pl. forest near the top of Mt. Penna, on overhanging rock, 1045 m, 14 April 2023, leg. *A. Guttová, L. Paoli*, det. *A. Guttová* (SAV0017680). – Species confirmed for Toscana.

Scytinium plicatile is a subfoliose to squamulose lichen, with cyanobacterial photobiont and thallus strongly gelatinous when wet, forming irregular (up to 5 cm) rosettes. In the study site, it grows together with other Collemataceae, namely *Enchylium polycarpon* (Hoffm.) Otálora, P.M.Jørg. & Wedin, *Lathagrium cristatum* (L.) Otálora, P.M.Jørg. & Wedin, *S. turgidum* (Ach.) Otálora, P.M.Jørg. & Wedin. The publication of a previous record of *S. plicatile* from Toscana dates back to 1871 (as reported in Nimis 1993).

A. Guttová, L. Paoli

***Usnea cornuta* Körb. (Parmeliaceae)**

+ **SAR**: S'Arcu de Schisorgiu, pass in road Santadi-S. Lucia, com. Assemini (Cagliari), (UTM WGS84: 32S 485570 4317899), on twigs of *Erica arborea* L., in macchia on mountain ridge, 375 m, 16 April 1997, leg. *H. Sipman*, *L. Zedda*, det. *P. Clerk* (B). Monte di Seneghe, loc. Cuguzzu, along the forest road to loc. Fontanas (Oristano) (UTM WGS84: 32T 4440628 462640), on the bark of *Quercus ilex* L., 711 m, 2 July 2023, leg. *P. Giordani*, det. *W. v. Brackel*. conf. *V. Otte* (GE2867). – Species new to Sardegna.

Usnea cornuta is growing on damp sites with frequent fog, mostly in the montane belt. This species is restricted to humid-temperate, oceanic areas (Nimis 2024). The recorded population (GE2867) was found in a mature forest of *Quercus ilex* L., characterised by the presence of numerous species of the *Lobarion* community, such as *Lobaria pulmonaria* (L.) Hoffm., *Ricasolia virens* (With.) H.H. Blom. & Tønsberg and *Sticta limbata* (Sm.) Ach. (Benesperi et al. 2018). The species is included in the Italian red list of epiphytic lichens as "Endangered" (Nascimbene et al. 2013).

P. Giordani, W. v. Brackel, L. Zedda

Acknowledgements

S. Ravera, L. Cancellieri and G. Filibeck collected data within the Project funded under the National Recovery and Resilience Plan (NRRP), Mission 4 Component 2 Investment 1.4 - Call for tender No. 3138 of 16 December 2021, rectified by Decree n.3175 of 18 December 2021 of Italian Ministry of University and Research funded by the European Union – NextGenerationEU, Award Number: Project code CN_00000033, Concession Decree No. 1034 of 17 June 2022 adopted by the Italian Ministry of University and Research, CUP B73C22000790001 (S.R.) CUP J83C22000860007 (L.C., G.F.), Project title "National Biodiversity Future Center - NBFC". M.M. Azzella, L. Cancellieri, G. Filibeck and L. Rosati are grateful to Parco Nazionale Gran Sasso e Monti della Laga and to Parco Nazionale d'Abruzzo Lazio e Molise for authorizing field sampling. L. Francesconi, G. Gheza and H. Mayrhofer thank D. Feiertag for sequencing the specimen of *Lecidella flavosorediata*. P. Giordani and W. v. Brackel are indebted to V. Otte from the Senckenberg Museum Görlitz for conducting the TLC. L. Rosati and G. Potenza are grateful to Provincia di Potenza for authorizing field sampling and to A. Cerverizzo (WWF-Basilicata delegate) for his support.

References

Aleffi M, Tacchi R, Poponessi S (2020) New checklist of the bryophytes of Italy. Cryptogamie, Bryologie 41: 147–195. https://doi.org/10.5252/cryptogamie-bryologie2020v41a13

Bazzichelli G, Abdelahad N (2009) Alghe d'acqua dolce d'Italia. Flora analitica delle Caroficee. Università degli Studi di Roma La Sapienza – Ministero dell'Ambiente e della Tutela del Territorio e del Mare, Roma, 73 pp.

Benesperi R, Nascimbene J, Lazzaro L, Bianchi E, Tepsich A, Longinotti S, Giordani P (2018) Successful conservation of the endangered forest lichen *Lobaria pulmonaria* requires knowledge of fine-scale population structure. Fungal Ecology 33: 65–71. https://doi.org/10.1016/j.funeco.2018.01.006

Biondi E, Blasi C, Burrascano S, Casavecchia S, Copiz R, Del Vico E et al. (2009) Manuale Italiano di interpretazione degli habitat della Direttiva 92/43/CEE. Società Botanica Italiana. Ministero dell'Ambiente e della Tutela del Territorio e del Mare, D.P.N. http://vnr.unipg.it/habitat [accessed 19.10.2023]

Blockeel TL, Bosanquet SDS, Hill MO, Preston CD (Eds) (2014) Atlas of British & Irish Bryophytes. Pisces Publications, Newbury.

Brackel W von (2013) Miscellaneous records of lichenicolous fungi from the Italian Alps. Herzogia 26: 141–157. https://doi.org/10.13158/heia.26.1.2013.141

Brackel W von (2016) Preliminary checklist of the lichenicolous fungi of Italy. Notiziario della Società Lichenologica Italiana 29: 95–145.

Caisová L, Gąbka M (2009) Charophytes (Characeae, Charophyta) in the Czech Republic: taxonomy, autecology and distribution. Fottea 9: 1–43. https://doi.org/10.5507/fot.2009.001

Caroti V, Lavorato C, Rotella M (2015) Cantharellaceae Schroeter della Calabria (Italia). Bollettino dell'Associazione Micologica ed Ecologica Romana 31: 12–28.

Cengia Sambo M (1932) Florula lichenica del Passo del Piccolo San Bernardo. Chanousia 2: 125–160.

Ciferri R (1938) Flora Italica Cryptogama. Rocca S. Casciano, XVI: 106.

Codroico R (2004) Il parco "Sigismondo Moll" a Villa Lagarina nel Trentino, tra Romanticismo e Neoclassicismo. Quaderni del Borgoantico 5: 3–12.

Cortini Pedrotti C (2001) Flora dei Muschi d'Italia. Sphagnopsida, Andreaopsida e Bryopsida (I parte). Antonio Delfino Editore, Milano-Roma.

Courtecuisse R, Duhem B (1995) Mushrooms and Toadstools of Britain and Europe. HarperCollinsPublishers, Ramsbury, Wiltshire, UK.

Diederich P, Millanes AM, Wedin M, Lawrey JD (2022) Flora of lichenicolous fungi. Vol. 1, Basidiomycota. National Museum of Natural History, Luxembourg.

Fariselli R, Nimis PL, Nascimbene J (2020) Catalogo critico dei licheni dell'Emilia-Romagna. AMSActa, Bologna, 200 pp.

Ferrari E, Bandini D, Boccardo F (2014) *Inocybe* (Fr.) Fr., terzo contributo. Edizioni Candusso, Alassio, 188 pp.

Filibeck G, Cancellieri L, Rosati L (2023) Guida al Paesaggio Vegetale del Parco Nazionale d'Abruzzo, Lazio e Molise. Edizioni del Parco, Pescasseroli, 344 pp.

GBIF.org (2024) *Parmelia discordans* Nyl. in GBIF Secretariat (2023). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei [accessed via https://www.gbif.org/species/2605976 on 25 January 2024]

Gerstmans C, Ertz D (2016) *Arthonia phlyctiformis* Nyl. (Arthoniaceae) retrouvé en France après plus d'un siècle. Bulletin d'informations de l'Association française de Lichénologie 41: 10–12.

Giacomini V (1938) Revisione delle briofite dell'Italia meridionale appartenenti all'Erbario A.G. Gasparrini. Parte I: Muschi. Atti Istituto Botanico "Giovanni Briosi" 10: 305–319.

Guiry MD, Guiry GM (2024) AlgaeBase. World-wide electronic publication, National University of Ireland, Galway. www.algaebase.org [accessed 22.1.2024]

Hawksworth DL, Poelt J (1986) Five additional genera of conidial lichen-forming fungi from Europe. Plant Systematics and Evolution 154: 195–211. https://doi.org/10.1007/BF00990123

Jatta A (1886) Lichenum Italiae meridionalis manipulus quintus, quem collegit et ordinavit. Nuovo Giornale Botanico Italiano 18: 78–114.

Jülich W (1989) Guida alla determinazione dei funghi, Vol. 2, Aphyllophorales, Heterobasidiomycetes, Gastromycetes. Arti Grafiche Saturnia, Roncafort di Trento, 597 pp.

Klement O (1969) Zur Flechtenflora der Äolis. Mitteilungen des Naturwissenschaftlichen Arbeitskreises Kempten (Allgäu) der Volkshochschule Kempten 13: 70–76.

Kuyper TW (1986) A revision of the genus *Inocybe* in Europe I. Subgenus *Inosperma* and the smooth-spored species of subgenus *Inocybe*. Persoonia 3 (Suppl.): 1–247.

Knudsen H, Persson O, Hansen EB (1997) Cantharellaceae J. Schröt. In: Hansen L, Knudsen H (Eds) Nordic Macromycetes, Vol. 3. Nordsvamp, Copenhagen, Denmark.

Malíček J (2014) A revision of the epiphytic species of the *Lecanora subfusca* group (Lecanoraceae, Ascomycota) in the Czech Republic. Lichenologist 46: 489–513. https://doi.org/10.1017/S0024282914000139

Meier MK, Roloff F (2017) *Didymodon sinuosus* (Mitt.) Delogne. In: Swissbryophytes Working Group (Hrsg.), Moosflora der Schweiz. www.swissbryophytes.ch [compiled 21/06/2021]

Millanes AM, Diederich P, Westberg M, Wedin M (2016) Three new species in the *Biatoropsis usnearum* complex. Herzogia 29: 337–354. https://doi.org/10.13158/heia.29.2.2016.337

Nascimbene J, Nimis PL, Ravera S (2013) Evaluating the conservation status of epiphytic lichens of Italy: a red list. Plant Biosystems 147: 898–904. https://doi.org/10.1080/11263504.2012.748101

Nimis PL (1993) The lichens of Italy: an annotated catalogue. Monografie XII. Museo Regionale di Scienze Naturali di Torino, Torino, 897 pp.

Nimis PL (2016) The lichens of Italy – A second annotated catalogue. EUT Edizioni Università di Trieste, Trieste, 740 pp.

Nimis PL (2024) ITALIC – The Information System on Italian Lichens. Version 7.0. University of Trieste, Dept. of Biology. https://dryades.units.it/italic [accessed 2.2.2024]

Nimis PL, Martellos S (2024) ITALIC - The Information System on Italian Lichens. Version 7.0. University of Trieste, Dept. of Biology. https://dryades.units.it/italic [accessed 13.1.2024]

Nimis PL, Tretiach M (1999) Itinera Adriatica. Lichens from the eastern side of the Italian Peninsula. Studia Geobotanica 18: 51–106.

Nimis PL, Hafellner J, Roux C, Clerc P, Mayrhofer H, Martellos S, Bilovitz PO (2018) The lichens of the Alps – an annotated checklist. MycoKeys 31: 1–634. https://doi.org/10.3897/mycokeys.31.23568

Onofri S, Bernicchia A, Filipello Marchisio V, Padovan F, Perini C, Ripa C, Savino E, Venturella G, Vizzini A, Zotti M, Zucconi L (2013) Checklist of the macrobasidiomycetes of Italy. http://dryades.units.it/macrobasidiomiceti/index.php [accessed 19.02.2024]

Pellegrini P (1942) Flora della Provincia di Apuania. E. Medici Editore, Apuania-Massa.

Poelt J (1990) Zur Liste der Flechten des Langtang-Gebietes. In: Miwhle G (Ed.) Langtang Himal. Flora und Vegetation als Klimazeiger und -zeugen im Himalaya. A prodromus of the vegetation ecology of the Himalayas. Dissertationes Botanicae 158: 434–438.

Ravera S, Puglisi M, Vizzini A, Totti C, Aleffi M, Barberis G, Benesperi R, von Brackel W, Dagnino D, De Giuseppe AB, Fačkovcová Z, Gheza G, Giordani P, Guttová A, Mair P, Mayrhofer H, Nascimbene J, Nimis PL, Paoli L, Passalacqua NG, Pittao E, Poponessi S, Prosser F, Ottonello M, Puntillo D, Puntillo M, Sicoli G, Sguazzin F, Spitale D, Tratter W, Turcato C, Vallese C (2019) Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 7. Italian Botanist 7: 69–91. https://doi.org/10.3897/italianbotanist.7.34285

Ravera S, Vizzini A, Puglisi M, Assini S, Benesperi R, Bianchi E, Boccardo F, Bottegoni F, von Brackel W, Clericuzio M, Darmostuk V, De Giuseppe AB, Di Nuzzo L, Dovana F, Galli R, Gheza G, Giordani P, Guttová A, Isocrono D, Malíček J, Martellos S, Mayrhofer H, Nascimbene J, Nimis PL, Paoli L, Passalacqua NG, Prosser F, Puntillo D, Seggi L, Sicoli G, Timdal E, Trabucco R, Vallese C (2022) Notulae to the Italian flora of algae, bryophytes, fungi and lichens: 13. Italian Botanist 13: 1–17. https://doi.org/10.3897/italianbotanist.13.82155

Ravera S, Vizzini A, Totti C, Puglisi M, Azzella MM, Battaglini A, Bernardo L, Bonini I, Calvia G, Cancellieri L, Cantonati M, De Giuseppe AB, Fačkovcová Z, Filibeck G, Galasso G, Galli R, Gheza G, Guttová A, Hafellner J, Isocrono D, Malíček J, Nascimbene J, Nimis PL, Ongaro S, Pandeli G, Paoli L, Passalacqua NG, Potenza G, Prosser F, Puntillo D, Rosati L, Rossi S, Rapaccini G, Sicoli G, Spitale D, Trainito E (2023) Notulae to the Italian flora of algae, bryophtes, fungi and lichens: 16. Italian Botanist 16: 105–120. https://doi.org/10.3897/italianbotanist.16.114044

Roux C, Monnat J-Y, Gonnet D, Poumarat S, Esnault J, Bertrand M, Gardiennet A, Masson D, Bauvet C, Lagrandie J, Derrien M-C, Houmeau J-M, Diederich P, David V, Ragot R, Carlier G, Van Haluwyn C, Chipon B, Vallade J, Lebreton E (2020) Catalogue des lichens et champignons lichénicoles de France métropolitaine. 3e édition revue et augmentée. Édit. Association française de lichénologie (AFL), Fontainebleu, 1769 pp.

Santesson R (1994) Fungi lichenicoli exsiccati. Fasc. 7 & 8 (Nos. 151–200). Thunbergia 21: 1–18.

Schneider SC, Nowak P, Von Ammon U, Ballot A (2016) Species differentiation in the genus *Chara* (Charophyceae): considerable phenotypic plasticity occurs within homogenous genetic groups. European Journal of Phycology 51: 282–293. https://doi.org/10.1080/09670262.2016.1147085

Scholz H, Scholz I (2005) Rote Liste und Gesamtartenliste der Brandpilze (Ustilaginales) von Berlin. In: Der Landesbeauftragte für Naturschutz und Landschaftspflege / Senatsverwal-

tung für Stadtentwicklung (Ed.) Rote Listen der gefährdeten Pflanzen und Tiere von Berlin. CD-ROM, Berlin.

Siniscalco C, Bianco PM, Lavorato C, Rotella M, Parrettini GL, Marra E, Floccia F, Campana L (Eds) (2018a) Abbinamento delle componenti micologiche della Calabria ai sistemi di classificazione degli Habitat EUNIS e Natura 2000. Prima correlazione delle specie fungine dei rimboschimenti. ISPRA, Manuali e linee guida n. 179/18.

Siniscalco C, Bianco PM, Lavorato C, Rotella M, Parrettini GL, Marra E, Floccia F, Campana L (Eds) (2018b) Abbinamento delle componenti micologiche della Calabria ai sistemi di classificazione degli Habitat EUNIS e Natura 2000. Prima correlazione delle specie fungine delle foreste naturali. ISPRA, Manuali e linee guida n. 180/18.

Sohrabi M, Leavitt SD, Obermayer W, Mayrhofer H (2023) *Circinaria nimisii* (Megasporaceae, lichenized Ascomycota), a new manna lichen from Greece. The Lichenologist 55: 367–376. https://doi.org/10.1017/S0024282923000336

Tønsberg T (1992) The sorediate and isidiate, corticolous, crustose lichens in Norway. Sommerfeltia 14: 1–331. https://doi.org/10.2478/som-1992-0002

Torkelsen A-E (1997) *Dacryomyces* Nees: Fr. In: Hansen L, Knudsen H (Eds) Nordic Macromycetes, Vol. 3. Nordsvamp, Copenhagen, Denmark.

Vitikainen O (1994) Taxonomic revision of *Peltigera* (lichenized Ascomycotina) in Europe. Acta Botanica Fennica 152: 1–96.

Zodda G (1913) Studio briogeografico sulla Basilicata e catalogo delle briofite di questa provincia sin oggi conosciute. Nuovo Giornale Botanico Italiano 20: 155–232.